

20.5: (÷) of Complex #'s

Recall: Rationalizing Irrational Denom.

• monomial:

$$\frac{(2)(\sqrt{3})}{(\sqrt{3})(\sqrt{3})} = \frac{2\sqrt{3}}{\sqrt{9}} = \frac{2\sqrt{3}}{3}$$

• binomial:

$$\begin{aligned} \frac{(2)(1+\sqrt{3})}{(1-\sqrt{3})(1+\sqrt{3})} &= \frac{2+2\sqrt{3}}{1+\underbrace{\sqrt{3}-\sqrt{3}}_{\text{cancel}}-\sqrt{9}} = \frac{2+2\sqrt{3}}{1-3} \\ &= \frac{2+2\sqrt{3}}{-2} \\ &= \frac{2}{-2} + \frac{2\sqrt{3}}{-2} \\ &= -1 - \sqrt{3} \end{aligned}$$

Process: (÷) Complex #'s

1) (x) num. and denom. by the conjugate of the denom.

• num: distribute or FOIL

• denom: Always FOIL

2) Combine like terms and simplify the num. and denom.

3) Express solution in simplest $a + bi$ form:

$$\frac{a + bi}{c} = \underbrace{\frac{a}{c}}_{\text{real}} + \underbrace{\frac{b}{c}i}_{\text{Imaginary}}$$

Ex: Divide and express the result
in simplest $a+bi$ form: $\frac{1-3i}{3i}$

(hint: $3i$ is really $0+3i$)

Ex: Divide and express in $a+bi$ form:

$$\frac{5}{1-2i}$$

Chapter 20.pdf - Adobe Reader

File Edit View Document Tools Window Help

21 / 57 102% Find

Homework:
PG. 940: 15-30 (:3)

940 THE COMPLEX NUMBERS

EXERCISES WITH OPEN-RESPONSE PROBLEMS

In 1–12, write the multiplicative inverse of each complex number in the form $a + bi$. Simplify, if possible.

- $3 + i$
- $6 - i$
- $1 + 5i$
- $4 - 3i$
- $9 - 2i$
- $7 + 5i$
- $4 - 4i$
- $5 + 5i$
- $3 + 6i$
- $8 - 4i$
- $\sqrt{5} + i$
- $2 - i\sqrt{3}$

In 13–19, in each case: a. Perform the indicated division. b. Check the answer. **- with Calc.**

- $(4 - 2i) \div (1 + i)$
- $(3 - i) \div (2 + i)$
- $(5 + 5i) \div (3 - i)$
- $\frac{5 - 3i}{1 - i}$
- $\frac{7 - 4i}{1 - 2i}$
- $\frac{21 + i}{5 - i}$
- $\frac{18 + i}{2 + 3i}$

In 20–27, perform each indicated division.

- $\frac{4 + i}{2 - 3i}$
- $\frac{6 + i}{6 - i}$
- $\frac{1 - 3i}{2 - 7i}$
- $\frac{5 + i}{5 - i}$
- $\frac{7 - i}{7 + i}$
- $\frac{1 + 3i}{2 + 4i}$
- $\frac{3 - 5i}{i}$
- $\frac{7 + 2i}{4i}$

28. For each description of a complex number in Column 1 find the corresponding value in Column 2.

Column 1	Column 2
1. The additive inverse of $2 - i$	a. $2 + i$
2. The conjugate of $2 - i$	b. $2 - i$
3. The multiplicative inverse of $2 - i$	c. $1 + 0i$